

## **REMARKS/ARGUMENTS**

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance.

### **I. STATUS OF THE CLAIMS AND FORMAL MATTERS**

Claims 21-31, 33-42, and 45-48 are pending in this application. Claims 23-27, 29-30, and 37-39 are withdrawn. Claims 43 and 44 have been canceled without prejudice. Claims 21, 31, 40, and 45-48 have been amended. New claim 50 has been added. No new matter has been introduced. Support for this amendment can be found throughout the Application as originally filed.

Changes to claims are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

### **II. THE REJECTIONS UNDER 35 U.S.C. § 112 HAVE BEEN OVERCOME**

Claim 48 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 48 inadvertently depended on canceled claim 32. Claim 48 has, therefore, been accordingly amended to depend from claim 31. Reconsideration and withdrawal of this rejection is, therefore, respectfully requested.

### III. THE REJECTIONS UNDER 35 U.S.C. § 102(b) HAVE BEEN OVERCOME

Claims 21, 22, and 28 were rejected under 35 U.S.C. § 102(b) over U.S. Patent Publication No. 2003/0145894 to Burns (“Burns”). Applicants traverse and respectfully request reconsideration and withdrawal of the rejections for at least the following reasons.

Claim 21 recites:

A device comprising first and second inlet passages for respective immiscible fluids, the first and second inlet passages merging into a third passage along which, in use, **the two fluids flow in intimate contact with each other under parallel laminar flow conditions**, the third passage being formed with a constriction or other discontinuity, in use, causing the two fluids to form into a flow of alternate segments. (Emphasis added)

The Burns references fails to disclose “... a third passage along which, in use, the **two fluids flow in intimate contact with each other under parallel laminar flow conditions**,” where “the third passage [is] formed with a constriction or other discontinuity, [which] caus[es] the two fluids to form into a flow of alternate segments.” as recited in claim 21.

The Office Action alleges that Fig. 9 of Burns discloses the recitations above. According to *page 3, paragraph [0038]*, and FIG. 9 of Burns, a reactor comprising an aqueous phase pump 19 and an organic phase pump 20 respectively connects to capillary tubes 9 and 10. These capillary tubes 9, 10 then pass into a distribution device 1 of the type shown in FIG. 2. An output capillary tube 11 passes from distribution device 1 and through a heater 21, where the capillary tube 11 is coiled for efficient use of space. The Burns distribution device 1, cited by the Examiner, is an independent device that connects to capillary tubes 9, 10, and 11. According to *page 3, paragraph [0035]*, and FIG. 1 of *Burns*, a syringe driver (not shown) is used to inject dyed kerosene along capillary tube 9 and into capillary pathway 2, and water along capillary tube 10 and into capillary pathway 3. A series of slugs 16, 17 (see FIGS. 4-7 and 8) are then formed in capillary pathway 4 and capillary tube 11. Initially, Applicant notes that the Office Action has

failed to show how distribution device 1 discloses a “third passage [that is] formed with a constriction or other discontinuity, [which] caus[es] the two fluids to form into a flow of alternate segments[,]” as recited in claim 21. Moreover, Burn’s slugs formed in the capillary pathway are *not* due to **“two fluids flow[ing] in intimate contact with each other under parallel laminar flow conditions[,]”** as further recited in claim 21.

For at least the foregoing reasons, Applicants respectfully submit that independent claim 21 is patentable over the relied upon portions of Burns, and is therefore allowable.

#### **IV. THE REJECTIONS UNDER 35 U.S.C. § 103(a) HAVE BEEN OVERCOME**

Claims 40, 41, and 48 are rejected under 35 U.S.C. §103(a) over Burns in view of U.S. Patent No. 5,957,579 to Kopf-Sill et al. (“Kopf-Sill”). Claims 31 and 33-35 are rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill, and further in view of U.S. Patent No. 5,376,252 to Ekstrom et al. (“Ekstrom”). Claim 36 is rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill and Ekstrom, and further in view of Japanese Patent No. 2002277478 to Takehiko (“Takehiko”). Claim 42 is rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill, and further in view of U.S. Patent No. 6,509,085 to Kennedy (“Kennedy”). Claims 43 and 47 are rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill and Kennedy, and further in view of Ekstrom. Claim 44 is rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill, Kennedy, and Ekstrom, and further in view U.S. Patent No. 3,537,889 to Mets et al. (“Mets”). Claim 46 is rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill, Kennedy, and Ekstrom, and further in view U.S. Patent Publication No. 2002/0040754 to Tomita et al. (“Tomita”). For the reasons set forth below, we traverse and respectfully request reconsideration and withdrawal of the rejections.

*A. Claims 40, 41, and 48*

Claims 40, 41, and 48 are rejected under §103 over Burns in view of Kopf-Sill. Claim 40 recites:

A fluid manipulation device ... wherein said first and second ducts join to form a third duct along which, in use, the first and second fluids flow under laminar flow conditions, the third duct being formed with a constriction, the constriction causing, in use, the first and second fluids to form into a flow of alternate segments, ...wherein the device comprises two substrates ..., **the substrates being encased within two or more casement layers, and the substrates being disposed within a cavity formed by the casement layers** (Emphasis added)

For similar reasons described below with regards to independent claim 31, neither Burns nor Kopf-Sill, taken alone or in combination, disclose or render predictable a “fluid manipulation device ... wherein the device comprises two substrates ..., **the substrates being encased within two or more casement layers, and the substrates being disposed within a cavity formed by the casement layers.**”

Accordingly, Applicants respectfully submit that claim 40 is in condition for allowance and urge reconsideration and withdrawal of this rejection thereto.

Claims 41 and 48 depend from independent claims 40 and 31, respectively. As nothing Burns and Kopf-Sill as applied to the independent claims, Applicants respectfully submit that these claims are also in condition for allowance and respectfully request reconsideration and withdrawal of the rejections thereto.

*B. Claims 31 and 33-35*

Claims 31 and 33-35 are rejected under 35 U.S.C. §103(a) over Burns in view of Kopf-Sill, and further in view of Ekstrom. Claim 31 recites:

A method of producing a segmented flow of first and second immiscible fluids comprising providing a device with a first conduit provided with a constriction or other discontinuity ... wherein the constriction or other discontinuity causes the first and second immiscible fluids to form into a flow of alternate segments

downstream of the constriction or other discontinuity, wherein the device comprises two substrates disposed face-to-face, the surface of at least one of the substrates being profiled such that the first and second inlet passages are defined between the two substrates, **wherein the substrates are encased within two or more casement layers, the substrates being disposed within a cavity formed by the casement layers.** (Emphasis added)

Claim 31 has been amended to include the subject matter of claim 44. The Examiner contends that claim 44 is obvious over Burns in view of Kopf-Sill, Kennedy, Ekstrom, and Mets. For the following reasons, Applicants respectfully submit that a person skilled in the art would *not* arrive at the subject matter of the invention based on the Burns, Kopf-Sill, Kennedy, Ekstrom, and Mets combination.

It is well established that nonanalogous art cannot be considered pertinent prior art under § 103 and therefore cannot be relied upon as a "'basis for rejection of an applicant's invention'." See M.P.E.P. § 2141.01(a) (quoting *In re Oetiker*, 977 F.2d 1443, 1446 (Fed. Cir. 1992)). The determination as to whether a reference is analogous art is two fold. First, it must be decided if the reference is within the field of the inventor's endeavor. If it is not, it must then be determined whether the reference is "reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d at 1446. The Federal Circuit has held:

A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.

*In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992).

In the present case, the combination of Burns, Kopf-Sill, Kennedy, Ekstrom, and Mets references do not satisfy the above well-established test of a reference falling into the category of analogous art, because Mets is not within the field of the instant inventors' endeavor. As

previously discussed, the instant invention, Burns, Kopf-Sill, Kennedy, and Ekstrom relate to micro-fluidic devices. In contrast, Mets relates to a porous ceramic fixture which is loaded with a solution of a metal, the metal being deposited onto the surface of a semi-conductor device on heating. Thus, depositing metal on the surface of the semiconductor device has no pertinence to the problems dealt with within the field of the claimed invention.

Further evidencing the different fields of invention between the instant invention and Burns, Kopf-Sill, Kennedy, Ekstrom, and Mets, are the USPTO classifications of the references. *See* M.P.E.P. § 2141.01(a). As detailed in the Application Data tab on the PAIR system for the instant application, the instant invention is classified in class 137. Similarly, Burns is also classified in class 137. In contrast, Kopf-Sill is classified in classes 204 and 156; Kennedy is classified in classes 428, 156, 427, 73, 204, and 436; Ekstrom is classified in classes 204, 73 and 210; and Mets is classified in class 171. Moreover, even as the USPTO classification is some evidence of analogy, similarities and differences in structure and function carry still more weight. *In re Ellis*, 476 F.2d 1370, 1372 (C.C.P.A. 1973). Thus, a person skilled in the art of micro-fluidic devices would, therefore, have no reason to consider Mets, especially since Mets relates to a totally different technical field.

For at least the foregoing reasons, Applicants respectfully submit that independent claim 31 is patentable over the relied upon portions of the cited references, and is therefore allowable. Since claims 33-35 depend from claim 31, it is submitted that claims 33-35 are also in condition for allowance.

***C. Claims 36, 42, and 46-47***

As pending dependent claims 36, 42, and 46-47 ultimately depend from independent claims 31 and 40, respectively, and nothing in the cited art of record cures the deficiency of

*Burns* as applied to independent claims 31 and 40, Applicants respectfully submit that all the claims are in condition for allowance and will therefore request reconsideration and withdrawal of the rejections.

**V. DEPENDENT CLAIMS**

The other claims in this application are each dependent from one of the independent claims discussed above and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

**CONCLUSION**

In view of the foregoing amendments and remarks, all of the claims in this application are patentable and Applicants respectfully request early passage to issue of the present application.

In the event the Examiner disagrees with any of statements appearing above with respect to the disclosures in the cited reference, it is respectfully requested that the Examiner specifically indicate those portions of the reference providing the basis for a contrary view.

The Commissioner is authorized to charge any additional fees that may be required to Deposit Account No. 50-0320.

Respectfully submitted,  
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